

2014

Winter Road Congress report Andorra



Report directed by: Roy Brannen, UK First Delegate and Director of Trunk Road & Bus Operations, Transport Scotland

Report compiled by: Justin Ward, Chartered Institution of Highways & Transportation on behalf of the World Road Association (United Kingdom)



Winter Road Congress Report, Andorra 2014

The Winter Road Congress took place from the 4–7 February 2014, this report summarises some key lessons from the UK from the UK delegates who attended the Congress.

The content of this report has been produced with the help of Stewart Leggett, Alan Chambers, Martin Hobbs, Matthew Lugg, David Weir, Brian Gordon, Kevin Campbell, Christopher Plumb and Paul Williams. Without their input the report would not have been possible. Their contribution to the Congress and actions to take forward the lessons learnt are to be commended. The congress had very good input from the UK particularly in the areas relating to the management and learning from extreme weather events.

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Introduction

The International Winter Road Congress took place in Andorra from 4th-7th February with 1500 delegates from across the globe expected to visit. In all there were more than 120 papers presented on all aspects of winter service delivery including traffic management and customer information. Over the last two years or so Winter Service Technical Committee 2.4 members Martin Hobbs, Stewart Leggett and Alan Chambers have as part of their work on the committee reviewed the content and planned the technical sessions together with contributed towards the wider planning aspects of the congress. The winter technical committee is unique in having to plan and organise a dedicated winter congress in addition to contributing to two seminars as all the other technical committees are required to do.

This report is split into; a list of the papers presented by UK participants, details of the snow plough competition and then a summary of the key areas of interest learnt at the congress that will be considered further. These include items on the delivery of winter service, organisational and traffic management and communications.

UK papers presented

Reducing costs and improving efficiency using route based forecasting	Patrick Sachon - Met Office
Improving the resilience of the United Kingdom's road network to the impact of severe winter weather	Matthew Lugg - Mouchel
Crisis management during extreme winter weather events	Martin Hobbs - Highways Agency
Estimating the cost of disruption to travel caused by severe winter weather	Karl Johnston – Transport Scotland
Multi agency response team (MART) approach to severe winter events	Hugh Gillies – Transport Scotland
Winter resilience in an unpredictable climate	Brian Gordon – BEAR Scotland
Development, implementation and evaluation of reduced salt spread rates	Christopher Plumb - Highways Agency
Risk management of concrete road bridges subject to de-icing salts and the possible effects of climate change	Gordon Anderson – Mouchel as part of the Unity Partnership in Oldham
Influencing road users during severe winter weather events	Alison Holliday - Highways Agency
Intelligently adding intelligence	Paul Williams - Atkins

Those giving presentations were also available in the main exhibition later on in the congress to be available to a wider audience and also to answer questions that there wasn't time for when they gave their presentation.

Snow plough competition

The snow plough competition is the fun element of the Congress and is aimed at the serious business of the management and maintenance of roads in winter. WRA UK had both the opportunity to contribute to, through the efforts of our driver Trevor Stirling RSNI, and learn from the Congress in this regard. It helped promote the importance of the work undertaken by the drivers and provided an opportunity to promote the benefits of driver training. The Andorran drivers were getting great support from their colleagues attending the championships and it was a good exercise to boost both team morale and team work. Transport Scotland are considering hosting a national pre-winter competition to achieve the above objectives and help promote media interest in winter preparations.

Press coverage of Trevor's achievement in the competition has been very good following the Congress.

Delivery of winter service

Liquid brine only spreading

Of interest was a report from Germany that demonstrated the durability of liquid (salt brine) only spreading in comparison with pre-wetted salt. They measured and compared the amount of salt and its distribution both shortly after spreading and also in hourly periods thereafter.

While recognising the many influences on the laying performance of salt the German results show generally clear tendencies: As widely known it showed a big loss, only 20% residual, of pre-wetted salt on the surface after the first hour. With the liquid brine only spreading they found greater durability with about 70% residual salt, and that this is maintained beyond the first few hours [figure 1].

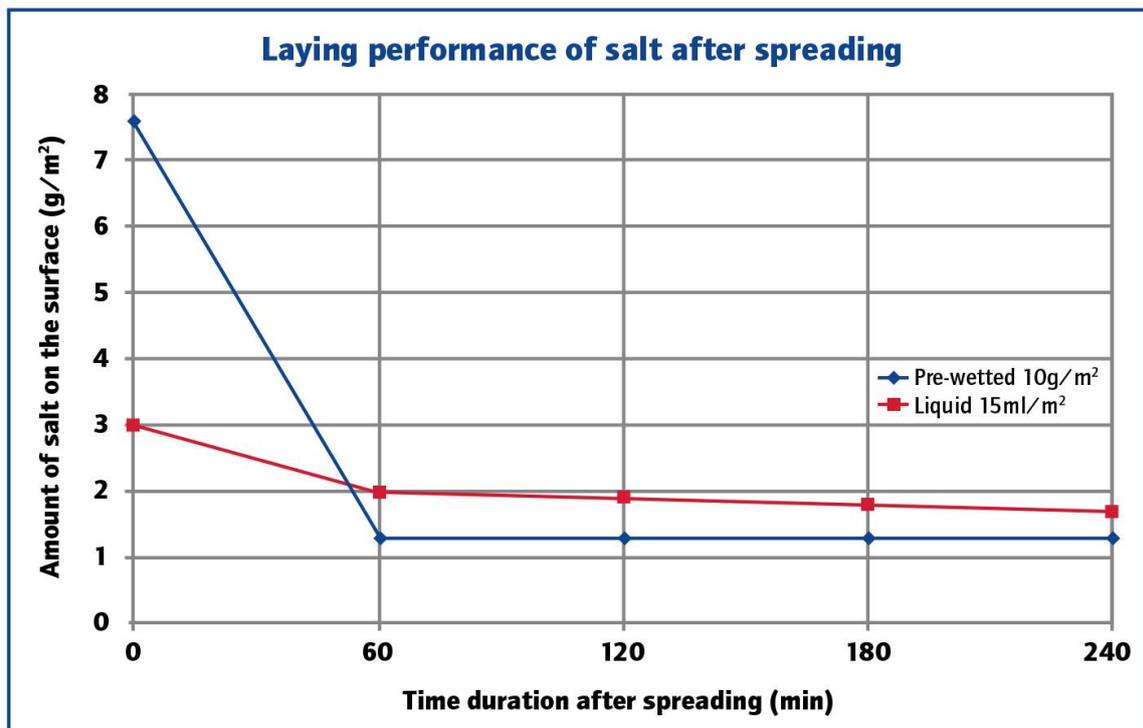


Figure 1: A comparison between pre-wetted and liquid spreading for winter pre-treatments

They concluded that for pre-treatments, especially on dry and moist surfaces that liquid brine only spreading is recommended because it requires less salt (one-third of the amount for pre-wetting) and

stays longer on the surface. With the improved residual properties of liquid spreading they also identified a lesser need to time the treatment for immediately before freezing as they do with pre-wetted spreading.

There are potential lessons then for the introduction and use of spraying brine as a pre-treatment; that requires an adaptation of existing salt spreaders to have dual capability: brine as precautionary treatment, salt – in advance of snow. Transport Scotland is interested in trialling this treatment technique in the wet Scottish climate. This is also of interest to the Highways Agency in particular with regard to dynamic sections of SMART motorways as treatment of hard shoulders needs to be active faster given the absence of traffic prior to opening.



The Ministry in Spain has made a sustained effort to optimize resource usage, concentrating mainly on promoting liquid treatment systems, encouraging to switch to brines for anti-icing instead of solid salt, improving treatment effectiveness while reducing resource waste and salt-related environmental impacts.

The Swiss are also using widespread brine only spraying on their high speed network. They have large articulated sprayers capable of spreading at 80km/h. Their experience mirrors that of Germany that brine only treatments result in increased durability of the treatment.

The Highways Agency are well placed to update their earlier work on the benefit case for brine only treatments in light of these latest findings for losses. The previous work showed, using brine losses measured on the HA network, that the case for brine spreading was not economically viable.

Mobile road condition sensor

From the Exhibition at the Andorra 2014 Congress, Transport Scotland found a new mobile road condition sensor that could aid winter decision making through gathering data from our condition patrol vehicles. The road condition sensor links with GPS and measures road surface state (dry, moist, wet,

slushy, snowy and icy) along with ice and water thickness in fractions of millimetres. Transport Scotland have agreed a trial to allow us to compare this new equipment against our existing sensors.

Transport Scotland has appointed one of their operating companies to undertake the trial this winter season [2013-14] on the south-west unit.

How to reduce salt usage

The salt usage in some areas of France had doubled in 10 years and a study was carried out in how to reduce salt usage. The actions undertaken to reduce the quantity of de-icing salts included:

- underlining the managers and workers' responsibility when they implement unsuitable or unjustified devices,
- explaining legal framework,
- letting the users know that road salts are not a universal remedy so users have to behave properly during winter time,
- relying on advanced technology to be more efficient, to reduce the consumption of road salts, to reduce environmental impact and in order to improve users' comfort,
- investing in new devices and advanced technology,
- training to drive spreaders and to use blade.
- better and calibrated equipment
- salt stock minimums adjusted annually
- training for client and decision makers
- modern fleet – improved maintenance
- driver training

The Highways Agency's presentation on '*Development, Implementation and Evaluation of Reduced Salt Spread Rates*' was well received. The presentation detailed the Agency's development of a performance specification to ensure that pre-wet spreaders distributed salt to the accuracy specified. Questions after the session highlighted a desire for road authorities to understand residual salt levels on a network wide basis rather than relying upon a limited number of point measurements, which could give decision makers confidence to deliver lower rate 'top-up' treatments. The poster session generated interest and a number of contacts have been established including with the East Nippon Expressway Company.

Preventive treatments

There was a study from Spain on how to optimise the application of preventive treatments on ice formation as a measure to decrease the cost and the environment impact, using a system of salinity control on dry roads treatments. This study was carried out on the trunk road between Madrid and Alicante and looked at the measurement of residual salt on the carriageway, key findings included:

- Brine assists with residual salt
- Measured using SOBO 20 device (a device to measure residual salt content)
- Asphalt – showed high residual salt the following afternoon after treatment
- SMA - showed even higher residual salt the following afternoon after treatment
- Residual salt still not a factor for not treating.

Spain showed the benefits of recent investment in research and development and winter service in general with strong presentations on their development of MDSS, the development of a mobile residual

salt detection device and how to engage the public and the media by carrying out live WM scenario testing in conjunction with TV companies.

Winter maintenance economic analysis

Transport Scotland presented a paper and participated in a poster session at the Congress on the economic and social impacts of severe winter weather and the potential benefits of Transport Scotland's recent investments in response to the severe winters of recent years. This was very well received, with most of the discussion following the presentations relating to this work. The consensus was that winter maintenance in general would benefit from more analysis of this nature demonstrating the value for public money that the activity provides and providing practitioners with evidence to argue for more funds in a competitive budget environment. In short, there will be merit in undertaking cost benefit analysis for marginal changes to individual elements of winter maintenance to assess if the balance of spend is correct within budgets. The paper "Cost-benefit analysis of road weather stations on highways" by Markus Streich might help with taking this forward.

There was significant follow up interest at the poster session, particularly from Vaisala, who are undertaking their own research into the benefits of winter road maintenance, and it was clear that the two approaches are complementary such that combining them would potentially provide a more powerful evidence base. TS Economists have since been in touch with Vaisala to explore potential options. Other connections were made with Canadian colleagues and later discussions generated suggestions as to how they could improve the analysis underpinning their approach to prioritisation of roads for winter maintenance.

Furthermore, it would be worth looking at bringing technical analytical methods to help prioritise winter road maintenance by route. Refers to techniques outlined in the paper "A Benefit-Cost Approach to Level of Service Standards for Winter Road Maintenance".

Generally by bringing econometric techniques to maintenance issues, if the data is strong enough, can help illuminate these issues and help with the focus of the policy response. This was addressed in the the paper "A Study on the Development of the Expressway Traffic Accident Damage Model in the Winter Season" by Jejin Park.

The use of data to inform longer term decision making was also discussed during the paper "Intelligently adding intelligence" by Paul Williams of the UK. This paper focussed on the use of long range weather forecasts to inform salt stock purchase decisions.

Organisational and traffic management

Management of HGV's in mountain passes

A number of UK representatives were interested to hear the challenges faced in Norway with the ability of heavy vehicles on steep hills on its many mountain passes and inclines. A paper by Torgeir Vaa discussed how vehicles stopping in the roadway are a significant problem on many roads in winter time, and this has led the Norwegian Public Roads Administration to implement a project that begins to examine what factors influence the ability of trucks to keep moving under poor driving conditions during the winter season.

Scotland has particular problems on some of its higher routes with inclines during snowfall and the A9 at Drumochter and Slochd, the highest points on the Scottish trunk road network, are particularly susceptible to heavy vehicles incidents during winter storms. Vaa's paper and earlier work by Øyvind Haaland from Norway in managing vehicles during severe weather were of particular interest. Since the congress Transport Scotland and its Operating Company have sought support from the Police and the freight industry stakeholders to come together to investigate new ways of managing the A9 and the Norwegian practices will be of value in informing our considerations.

In certain locations and conditions the Norwegians stack the HGV's and convoy them through difficult sections of road thus being able to control their speed and ploughing and treating in advance of the convoy.



HGV's on inclines

A further paper by Torgier Vaa looked into what influences the ability of HGVs to climb steep inclines during snowfall. The configuration of the vehicle, type of tyre, load, speed and whether the bogey was lifted were all considered. One of the key findings relates to whether the bogey (an additional axle on the tractor unit that is used to reduce the weight on the other axles) was lifted. By lifting the bogey, additional weight is put onto the driving axle which provides greater traction and therefore an increased likelihood of being able to make the incline. This idea will be discussed with the Freight Transport Association and Road Haulage Association to see if this is something they may wish to consider promoting. The potential issue is that lifting the bogey could put an axle over weight and encouraging such action would need official sanction given the potential legal and insurance implications. Once industry views are sought the Highways Agency will approach the Department of Transport as this research finding is worthy of further consideration in the UK.

Communications

Communications to the public

Representatives from TC2.4 Winter Service presented their findings on the use of data produced from cars to enhance the real-time data available to the winter professional. By contrast in the same technical session, Slovenia presented on the use of Road Weather Information Systems (RWIS) data transmitted directly to the public's vehicles to give them real-time data.

The host country of Andorra provided an interesting insight into how they manage the public's behaviour through the use of VMS, the media, web channels and text messaging. A series of alert levels are in place which require certain actions from the road users. These actions include the use of snow chains, reduced speed limits, HGV bans on certain routes and the reduction of public transport. This has required a change to legislation and is being reinforced by an improved signalling system however aims to keep traffic moving albeit at a reduced speed.

Italy have a similar alert system in place with predefined actions required at each stage. Their plans also involve stacking HGVs some distance from the vulnerable section to ensure that routes do not become blocked with stranded HGVs.

Communications innovations and contacts

The Highways Agency presentation regarding our winter driving campaign was very well received at the Congress. The HA approach was recognised as good practice, and many questions were asked at the presentation itself.

Further contacts have been made with UK organisations and international organisations such as CEDR and roads authorities based in Norway, USA and Canada. These areas are being taken forward in terms of winter driving communication campaigns and other road user campaigns such as cycling.

Conclusion

The congress was well supported by the UK with ten papers presented, a number of companies having stands in the exhibition together with a few delegates from the UK. The involvement in such events not only allows the UK to showcase its techniques and approaches but most importantly allows us to further benefit from developments and ideas in other countries. As can be seen from this report there is a lot we can learn and will be investigating over the coming months. This will further enhance the winter service resilience we provide to our customers as well as the efficiency with which it is delivered.